CLAIMS

1. A kinematic device for supporting and programmably moving a terminal element in a machine or an instrument including a fixed base defining a reference plane, said device comprising a support and drive structure with at least two rigid legs connected via respective ends to members guided so that each of them moves with only one degree of freedom relative to the base, and via respective other ends to a platform itself connected to said terminal element, the connections between the legs and the platform and between the legs and the guided members being joints, and the movement of said guided members making it possible to move said platform at will within a predetermined workspace, wherein in order to enable the terminal element to pivot about an axis belonging to the platform, the support and drive structure includes an auxiliary structure organized to transmit to the terminal element a resultant force that determines a rotation of the terminal element about said axis in response to one or more coordinated movements of one or more auxiliary guided members, each of which moves with one degree of freedom relative to the base, and wherein said auxiliary structure comprises at least one articulated system which is made up of a rigid drive element connected at one of its ends via a joint to an auxiliary member guided so as to move with one degree of freedom relative to the base, and of a portion of said auxiliary structure transmitting said resultant force to the terminal element, the geometrical configuration of the transmission portion being such that regardless of the position of the terminal element the property of "angular stiffness tracking" (as defined in the description) is fulfilled throughout the workspace.

2. A device according to claim 1, wherein said portion of the auxiliary structure that transmits the pivot force to the terminal element comprises a pivot plate hinged to the terminal element about an axis parallel to said axis

associated with the platform, and a control bar hinged at one of its ends to the pivot plate via an intermediate joint and at its other end to a guided member for supporting one of the legs of the support and drive structure, the rigid drive element thus acting on the pivot plate while the control bar controls the direction of the resultant force.

3. A device according to claim 2, wherein the terminal element and the platform are two members that are secured together, and the axis associated with the platform is determined by the locations of the joints via which the legs are hinged to the platform. (Fig. 3, Fig. 4, Fig. 5, Fig. 6).

4. A device according to claim 2, wherein the terminal element and the platform are two distinct members associated with each other via a joint, the platform being mounted on the base so that said guided members constrain it to move in translation only, and said axis associated with the platform being the axis of the joint via which the terminal element is hinged to the platform. (Fig. 7 and Fig. 8).

5. A device according to claim 1, wherein the terminal element and the platform form a single composite member in two portions that are secured to each other, the axis associated with the platform being determined by the locations of the joints via which the legs are hinged to the platform, and wherein said transmission portion of the auxiliary structure includes an element which projects laterally relative to said composite member and on which a joint is placed between the rigid drive element and the terminal element, the joint determining the point of application of said resultant force applied by the rigid drive element to said transmission portion, and the geometrical shape of said transmission determining the conditions under which the forces are applied (Fig. 1).

6. A device according to claim 1, in which the terminal element and the platform form a single composite member in two

portions that are secured together, wherein said transmission portion of the auxiliary structure is constituted merely by a joint between the rigid drive member and the terminal element, determining the location of the point of application of said resultant force applied by the rigid drive element to said transmission portion, and wherein the one or more guided members of the auxiliary structure are mounted on the base so as to steer the rigid drive element along a line such that the location of the point of application on the terminal element constrains the resultant force to have a direction perpendicular to the line connecting said location of the joint to the axis associated with the platform. (Fig. 2).

7. A device according to claim 1, wherein said support and drive structure comprises means actuated by at least one auxiliary guided member mounted to move with one degree of freedom relative to the base so as to move the platform in a direction parallel to said pivot axis associated with the platform, said means being combined with said auxiliary structure. (Figs. 1, 2, 3, and 5).

8. A device according to claim 1, wherein at least some of the joints are ball and socket joints, and in that said support and drive structure is organized such as to enable the terminal element to move in three dimensions, the workspace extending to a volume determined by the amplitude of the movements of said guided members.

9. A device according to claim 1, wherein at least three of the working joints are pivot joints, the pivot axes being mutually parallel, and wherein the workspace is limited to an area contained in a plane perpendicular to said reference plane and to the pivot axes.

10. A device according to claim 9, wherein the machine or the instrument includes a support suitable for being moved along an axis parallel to the pivot axes and serving to receive a workpiece on which the terminal element acts.

11. A device according to claim 1, wherein with the volume of the workspace to which the terminal element has access being predetermined, the dimensions, the locations, and the configurations of the support and drive structure are determined by computation as a function of said volume.

12. A device according to claim 1, wherein at least one of the guided members is guided in translation.

13. A device according to claim 1, wherein at least one of the guided members is guided in rotation.

14. A device according to claim 1, wherein at least one of the guided members is a motor-driven member.

15. A device according to claim 1, wherein said joints are pivot, ball and socket, or universal joints.

16. A device according to claim 1, wherein the geometrical configuration of the transmission portion is arranged so that within said predetermined workspace, said resultant force is applied by the rigid drive element to said transmission portion at a point of application, and a projection of said resultant force in a plane perpendicular to said axis associated with the platform has, at said point of application, a direction which is at least approximately perpendicular to the line joining, in said projection, said axis associated with the platform to said point of application.

17. A kinematic device for supporting and programmably moving a terminal element in a machine or an instrument including a fixed base defining a reference plane, said device comprising a support and drive structure with at least two rigid legs connected via respective ends to members guided so that each of them moves with only one degree of freedom relative to the base, and via respective other ends to a

platform itself connected to said terminal element, the connections between the legs and the platform and between the legs and the guided members being joints, and the movement of said guided members making it possible to move said platform at will within a predetermined workspace, wherein in order to enable the terminal element to pivot about an axis belonging to the platform, the support and drive structure includes an auxiliary structure organized to transmit to the terminal element a resultant force that determines a rotation of the terminal element about said axis in response to one or more coordinated movements of one or more auxiliary guided members, each of which moves with one degree of freedom relative to the base, and wherein said auxiliary structure comprises at least one articulated system which is made up of a rigid drive element connected at one of its ends via a joint to an auxiliary member guided so as to move with one degree of freedom relative to the base, and of a portion of said auxiliary structure transmitting said resultant force to the terminal element, the geometrical configuration of the transmission portion being such that, regardless of the position of the terminal element within said predetermined workspace, said resultant force is applied by the rigid drive element to said transmission portion at a point of application, and a projection of said resultant force in a plane perpendicular to said axis associated with the platform has, at said point of application, a direction such that the working element is subjected to a usable moment throughout the workspace.